US-PAT-NO: 6271796

DOCUMENT-IDENTIFIER: US 6271796 B1

TITLE: Built-in antenna for radio communication terminals

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Detailed Description Text - DETX (8):

FIG. 8 shows the directivity of the free space horizontal plane (X-Y plane) at 2 GHz in the case of the radio apparatus bottom board of 125 mm.times.30 mm in size and the distance of the loop antenna from the radio apparatus bottom board of 3 mm and the distance between the plane of the radio apparatus bottom board. From FIG. 8, it is clear that the directivity exists in the direction in which the antenna is installed (X-axis direction) which is opposite to the human body with respect to the plane of the radio apparatus bottom board. FIG. 9 shows the directivity of the horizontal plane (X-Y plane) when the radio apparatus is communicating. This gives an

understanding that the radio apparatus bottom board operates as a reflector, achieving a high-gain antenna with less influences of the human body.

Detailed Description Text - DETX (9):

As shown above, the built-in antenna for radio communication terminals according to the first embodiment of the present invention has a loop antenna with a circumference of approximately one wavelength or less placed at an extremely short distance compared with the wavelength from the plane of the radio apparatus bottom board, with its loop plane set perpendicular to the plane of the radio apparatus bottom board which is opposite to the human body and supplies power via a balanced/unbalanced conversion circuit, which causes the radio apparatus bottom board to operate as a reflector, implementing an antenna having directivity in the direction in which the antenna is installed which is opposite to the human body with respect to the plane of the radio apparatus bottom board.

Detailed Description Text - DETX (10):

Furthermore, this antenna finds impedance matching between the antenna and transmission/reception circuit, minimizes the antenna current flowing into the radio apparatus bottom board by the balanced/unbalanced conversion circuit, makes the radio apparatus bottom board operate as a reflector and has directivity in the direction in which the antenna is installed which is opposite to the human body with respect to the plane of the radio apparatus bottom board.

Claims Text - CLTX (11):

wherein said terminal bottom board reflects an electromagnetic wave from said loop antenna in a direction away from a user; and

Claims Text - CLTX (25):

wherein said terminal bottom board reflects an electromagnetic wave from said second loop antenna in a direction away from the user; and

Claims Text - CLTX (33):

wherein said terminal bottom board reflects an electromagnetic wave from

said second loop antenna in a direction away from the user; and

Claims Text - CLTX (49):

wherein said terminal bottom board **reflects an electromagnetic wave from said second loop antenna** in a direction away from the user; and

Claims Text - CLTX (55):

wherein said terminal bottom board **reflects an electromagnetic wave from said second loop antenna** in a direction away from the user; and

Claims Text - CLTX (61):

wherein said terminal bottom board **reflects an electromagnetic wave from said second loop antenna** in a direction away from the user; and

Current US Original Classification - CCOR (1):

343/702